



FLIGHT ITEM—Fourth-year apprentice Garland B. Moreland of Technical Services Division Sheetmetal and Welding Branch fabricates a housing for a dosimeter ionization chamber on a metal spinning lathe. The ionization chamber is being built for Space Physics Division and will be used in future Apollo missions to measure radiation in the Van Allen belt.

Brazil, MSC Launch Van Allen Belt Probe

The first in a series of sounding rocket probes of the South Atlantic inner radiation belt launched from Natal, Brazil, was described as successful by project officials.

The probe, which carried an 80-pound experiment package 502 miles over the Atlantic, was launched at 6:41 pm CDT June 11 from the Barreira do Inferno range near Natal. The project—South Atlantic Anomaly Probe (SAAP)—is a cooperative effort of NASA and the Brazilian National Space Commission (CNAE).

Data obtained from the flight, which lasted 15 minutes, will be useful to scientists in studying the dynamics of the inner radiation belt (Van Allen) and provide information useful in safeguarding Apollo crews in relatively low altitude missions in the vicinity of the radiation belts.

Preliminary analysis of the data indicates that the experiments carried in the nose cone of the Canadian manufactured Black Brant IV launch vehicle performed according to plan. A detailed analysis of data will be carried out at MSC.

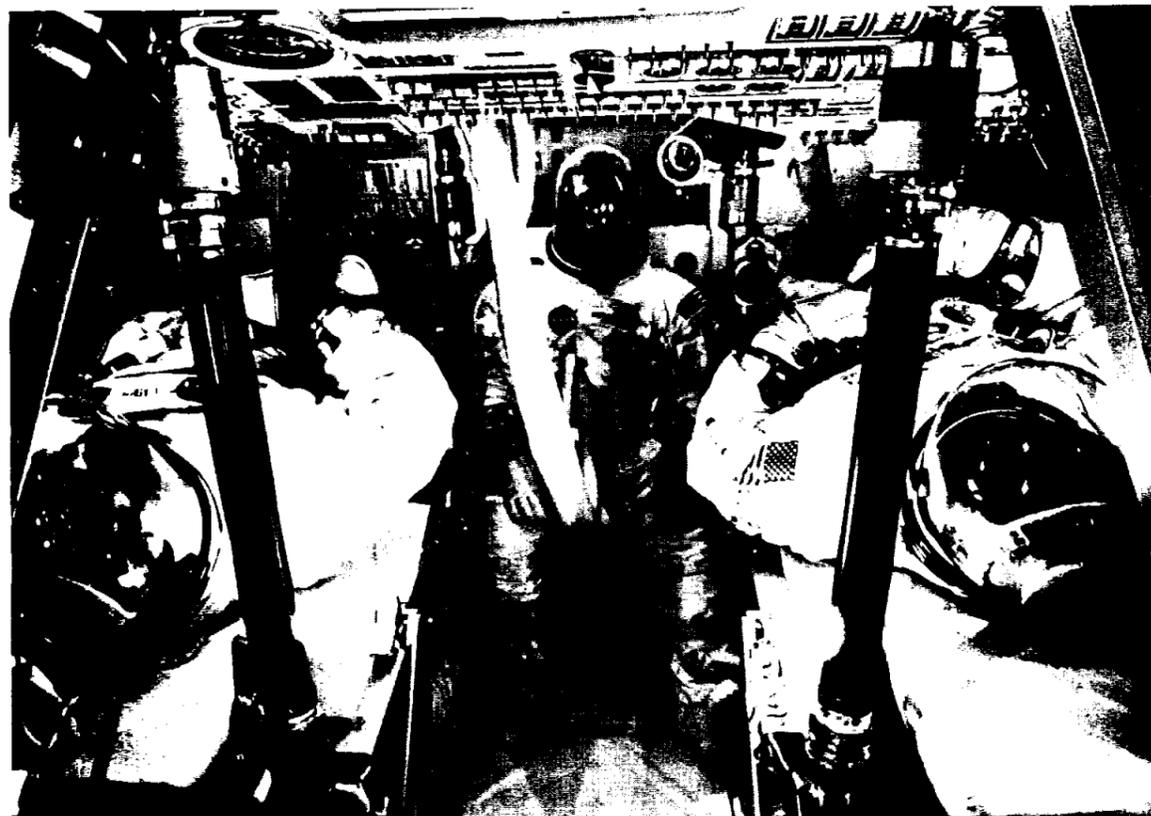
Project officials report from Brazil that the two-stage, solid propellant vehicle performed "better than expected." The 37-foot tall rocket launched the experiment package into the anomaly on a ballistic trajectory.

The experiment package splashed down 328 miles southeast of the launch site. Recovery of the package was not planned.

The Space Physics Division of MSC directed the program. The Sounding Rocket Branch of

NASA's Goddard Space Flight Center, Greenbelt, Maryland, assisted in the launch and data recovery. For Brazil, the CNAE provided overall management direction and scientific coordination and the Brazilian Ministry of Aeronautics carried out the launch and data recovery operations.

Similar flights are planned later to obtain further data on the radiation belt.



HOME FOR WEEK—Crewmen for the Apollo 2TV-1 thermal-vacuum test underway in the MSC Space Environment Simulation Laboratory Chamber A await hatch closure and the start of chamber pumpdown. The crew doffed their pressure suits and wore inflight coveralls following chamber pumpdown. Left to right are Joseph Kerwin, Vance Brand and Joe Engle. The 2TV-1 spacecraft is almost identical to the spacecraft to be flown in the first manned Apollo mission, and many of the test's objectives are in support of Apollo VII.

ROUNDUP

NASA MANNED SPACECRAFT CENTER

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Crew Enters Apollo 2TV-1 For Seven-Day Vacuum Test

A thermal-vacuum manned test of an Apollo spacecraft in the MSC Space Environment Simulation Laboratory Chamber A was in a 45-hour side solar simulation phase at *Roundup* press time following a 15-hour hold in the test caused by an unexplained rise in Chamber pressure. The 2TV-1 test could last up to seven-and-a-half days.

Crewmen Joseph Kerwin, Vance Brand and Joe Engle entered the 2TV-1 spacecraft Sunday June 16 with hatch closure at shortly before 11 am. Chamber pumpdown began at 2:23 pm toward the desired equivalent altitude. The crew doffed pressure suits later Sunday afternoon and donned the constant-wear garments and inflight coveralls.

If the test runs to full duration, the crew will egress the spacecraft either late Sunday or Monday June 24. The test medical officer reported that all three crewmen were in good condition and were sleeping and eating well.

In a pre-test press conference, MSC Director of Engineering and Developing Maxime Faget said the 2TV-1 command and service modules test and a similar test successfully completed June 1 with the Apollo lunar module (LTA-8) provide flight-type information on spacecraft performance at a great savings in cost.

"Except for weightlessness we can reproduce most of the conditions in the vacuum chambers a

spacecraft will encounter in earth orbit or on flights to the moon," said Faget, "with the added advantage of being able to return spacecraft and crew to earth atmospheric conditions in a matter of seconds."

Thermal-vacuum testing of the command and service modules is being conducted in MSC's Space Environment Simulation Laboratory, Chamber A—a 120-foot high, 65-foot diameter stainless steel tank which can simulate the vacuum and temperatures of space more than 130 miles above earth.

Although not intended to fly, spacecraft 2TV-1 was built to the same exacting specifications, of the same materials and with nearly all of the same flight-qualified equipment aboard as the Apollo spacecraft which

astronauts are to fly in earth orbit for the first time this year. The test vehicle and the flight vehicle were assembled side-by-side at the North American Rockwell Corporation plant, Downey, Calif., and both incorporate extensive safety modifications including a new quick-release hatch and fire-proof cabin materials.

The primary objectives of 2TV-1 vacuum chamber tests at MSC include proving out the spacecraft structure and pressure vessel and verifying its environmental control system in the temperature and vacuum extremes to be encountered in space.

The crew will perform many of the same functions aboard the craft as will be carried out by

(Continued on page 2)

Apollo VII Undergoes Combined System Test

A combined systems test of the Apollo spacecraft destined for the first manned Apollo mission was conducted this week at NASA Kennedy Space Center. The combined systems test was aimed toward validating simultaneous performance of all spacecraft systems and subsystems.

Crew for the Apollo VII mission later this year will be astronauts Walter M. Schirra, Jr., commander; Donn F. Eisele, command module pilot, and

Walter Cunningham, lunar module pilot. The open-ended mission may last up to 11 days.

The spacecraft was installed in the KSC altitude chamber last week and following the combined systems test, it will be put through both unmanned and manned altitude runs.

The spacecraft will be further tested in the KSC Manned Spacecraft Operations Building preparatory to being moved to Launch Complex 34 at Cape Kennedy, where it will be placed on its Saturn IB launch vehicle. Tests and checkout procedures have been underway on the launch vehicle on the pad for several months.

The Apollo VII mission will demonstrate performance of the spacecraft's command and service modules, the crew, and the support facilities during an Earth orbital mission of up to 11 days in duration.

A Saturn IB will boost the Apollo into a 120-by-150-nautical-mile orbit with a mid-morning launch from Cape Kennedy Launch Complex 34.

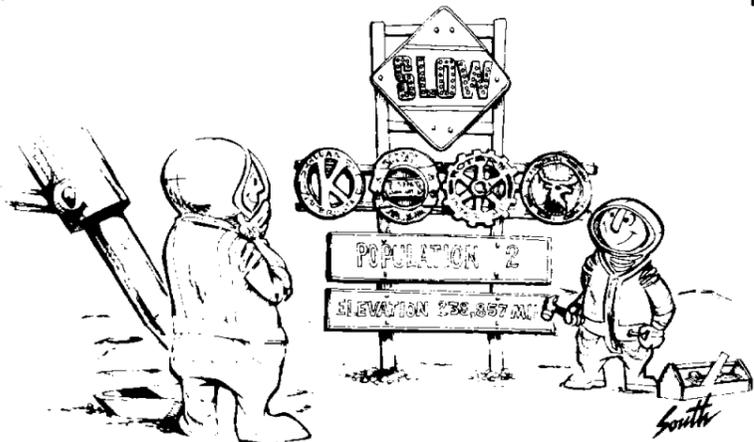
During the second revolution, the flight crew will separate the Apollo from the S-IVB stage and perform a transposition and simulated docking maneuver similar to the one to be performed on a mission to the Moon.

The first two Apollo service propulsion system burns will set up orbital conditions for rendezvous with the S-IVB stage approximately 30 hours into the mission. The Apollo service module reaction control system thrusters will be used for final phases of the rendezvous.

(Continued on page 2)

THE ASTRONUTS

(filched from TRW Systems Group)



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Director Dr. Robert R. Gilruth
 Public Affairs Officer Paul Haney
 Editor Terry White
 Staff Photographer A. "Pat" Patnesky

Pioneer VIII Measures Earth's Magnetic Tail

The Earth's magnetic tail may be far shorter than some scientists have thought.

Flight of the Pioneer VIII spacecraft through the tail region at 1,750,000 miles from the Earth last January produced some surprises. Instead of having the smooth cylindrical structure expected at this distance, the tail was more like a turbulent wake.

The Pioneer Project is managed by the NASA Ames Research Center, Moffett Field, Calif.

The tail is the extension of the Earth's protective magnetic envelope (the magnetosphere), blown into a long, comet-like tail by the solar wind.

Studies of the tail help man to understand the relationship of the Earth's magnetic field and the solar wind. The Earth's field and the solar wind establish the magnetosphere, which protects

the Earth and man from solar particle radiation.

The Earth's field is known to have undergone large changes, and currently is declining in strength. Recent measurements also indicate that solar particle bombardment, as channelled by the magnetosphere, may possibly affect the Earth's weather circulation.

The solar wind is the million-mile-an-hour flow of particles, constantly moving from the Sun's surface toward the edges of the solar system.

Certain theoretical calculations suggest that the tail could be 200 million miles long; others suggest that it is relatively short. However, when Pioneer VII flew through the tail in September 1966 at 3.5 million miles from the Earth, it found long periods when the solar wind was completely or partially blocked out. This suggested that the spacecraft had seen the end of the well-organized tail region.

While all Pioneer VIII data have not been analyzed, conditions in the tail at 1.75 million miles appear to be much the same as at 3.5 million miles, according to Dr. John Wolfe, Pioneer project scientist. He now is inclined to think the tail may have successive turbulent and smooth areas.

Pioneer VIII probably has taken man's last "look" at the extended tail for five years, Pioneer Project Manager Charles F. Hall said, because no further missions through that region are planned.

Measuring the tail closer in than 1.75 million miles is difficult, he says. A spacecraft on the long elliptical orbit needed to go closer in would be near escape speed. If escape occurred, it would be lost in interplanetary space. An interplanetary spacecraft passing this close in could easily be trapped in Earth orbit.

2TV-1 Chamber Test

(Continued from page 1)

astronauts in space, including eating and sleeping. Except for weightlessness, their week aboard the vehicle will be much like actual space flight, with the crew operating guidance and navigation equipment, simulating engine firings and activating and checking-out spacecraft systems.

The command module cabin was filled with a mixture of 60 percent oxygen, 40 percent nitrogen at the beginning of the test, with pure oxygen gradually replacing the 60/40 mixture following chamber pumpdown. This is similar to the procedure which will be followed in actual missions, where the 60/40 mixture at a pressure of 16 pounds per square inch will be used in launch pad operations, being replaced by pure oxygen at a pressure of five pounds per square inch in orbit.

2TV-1 thermal vacuum testing is divided into six major phases: crew ingress and a 19-hour chamber pumpdown phase, a 15-hour hot-soak phase with the command module oriented toward the top solar simulators followed by a 15-hour cold-soak with solar simulators off, 45-hours with the chamber side solar simulators providing maximum heating to the service module, 71 hours of alternate and contingency operations, and a 12-hour entry phase.

The spacecraft is mounted vertically in Chamber A on a rotating platform so it can be exposed to a wide range of simulated solar effects from maximum surface heating of +150°F to minimum temperature of -150°F.

Spacecraft 2TV-1 arrived at MSC in mid-April to be readied for manned vacuum chamber tests and completed pre-test checkout and servicing on schedule. The vehicle must satisfactorily complete thermal vacuum test objectives before the first manned flight of the Apollo command and service modules.

Your Job in Focus

Pending Legislation

Following is the status of pending legislation of interest to MSC employees:

S.3404—To amend the Civil Service Retirement Act to

authorize the retirement of employees after twenty-five years of service without reduction in annuity. 4-29-68—Introduced in the Senate and referred to the Committee on Post Office and Civil Service.

H.R.6157—To permit Federal employees to purchase shares of Federal or State chartered credit unions through voluntary payroll allotment. 2-6-68—Passed the House and referred to the Senate's Committee on Banking and Currency.

H.R.13738—To increase the maximum rate of per diem allowances for employees of the Government traveling on official business, and for other purposes. (Under this bill, the maximum per diem rate would be increased to \$20 a day, and the actual expense rate to \$35 a day.) 10-27-67—Introduced in the House. 4-23-68—Passed the House and referred to the Senate Government Operations Committee.

H.R.15951—To provide for uniform annual observances of certain legal public holidays on Mondays, and for other purposes. 3-13-68—Introduced in the House. 5-9-68—Passed the House and referred to the Senate Committee on the Judiciary.

Pay Raise

President Johnson on June 11, 1968 signed Executive Order 11413, providing pay raises for Federal employees to become effective on the first day of the first pay period beginning on or after July 1, 1968.

For NASA, the pay adjustment is effective with the pay period beginning July 14, 1968. The proposed pay scale published in the April 26 Roundup reflects the new salary rates. Wage Board employees are unaffected by this adjustment.

The risk of dying
 in the prime of life
 is more than
twice

as great for men who are heavy cigarette smokers as for men who are nonsmokers.



American Cancer Society

Apollo Chute Test Series Nears Finish

The sixth in a series of seven verification tests of a modified Apollo earth landing system Tuesday was completed successfully at the Naval Air Facility, El Centro, Calif.

A heavy boilerplate command module weighing 13,500 pounds was dropped from an aircraft for the test. One of two drogue chutes and the three main chutes were deployed automatically; the second drogue deliberately was not deployed to provide a severe test condition.

The final full-scale test drop will be made next week, and an ultimate-load test of the drogues will be run later this month to make up for a test which failed to achieve desired test conditions.

Outgoing and Incoming



NEW CHAIRMAN—Ross R. Seger of ASPO Program Control Division, right, takes over the reins as chairman of the Houston Chapter of the Society of Logistics Engineers from outgoing chairman H. P. Douglas of Lockheed Electronics. SOLE's primary aim is to upgrade the logistics field into a system of scientific disciplines and to foster inclusion of logistics instruction into university curricula.

Brock New ACM Rep

Computation and Analysis Division chief Eugene H. Brock recently was elected south central regional representative for the Association for Computing Machinery for the period 1968-1970.

Apollo VII

(Continued from page 1)

An eighth burn will be a de-orbit maneuver, under control of Apollo's guidance and navigation subsystems.

Reentry will be controlled manually by the crew, with splash-down in the Atlantic at approximately 6 am CST on the 11th day.

Schirra has flown two previous space missions. On October 3, 1962, Schirra piloted his Sigma 7 Mercury spacecraft on a nine-hour, six-orbit near-perfect space flight. In mid-December 1965, Schirra teamed up with Tom Stafford to accomplish the world's first rendezvous in space. The Gemini VI spacecraft rendezvoused and maneuvered to within one foot of Gemini VII.

Apollo VII will be the first space flight for Eisele and Cunningham.

Roundup Swap-Shop

(Deadline for classified ads is the Friday preceding Roundup publication date. Ads received after the deadline will be run in the next following issue. Send ads in writing to Roundup Editor, AP3. Ads will not be repeated unless requested. Use name and home telephone number.)

FOR SALE/RENT—REAL ESTATE

Five acres of land off Manville Highway on Country Road 101. MI 5-0188.

8-month old French Provincial in Baybrook: 4 bedrooms, separate dining room and living room, large family room w/fireplace, kitchen and dinette, utility room and separate two-car garage with fenced backyard. Refrigerator, washer, dryer and miscellaneous furniture included, central air/heat, located on court, away from main traffic and apartments. Cost \$25,000 equity and assumption. Dave Peterson, GR 4-3681 after 5.

Heavily-wooded corner lot, 90x200 ft., Oak Hollow subdivision in Dickinson. Most surrounding area lots already developed. Good price. Don Wade, MI 9-0554.

Clear Lake City, 4-2-2, family room, central air & heat; cul-de-sac. Membership in recreation center included, available about June 30, Lease \$245. RE 3-7667.

For rent, 4-2-2, brick, central air/heat, fenced, landscaped yard, walk to elementary school, completely carpeted, all built-ins. \$210/mo., lease option available. John Tuffy, HU 2-1326.

3-bedroom frame in Dickinson convenient to shopping center and school. Central heat, two-ton air conditioner. Nice neighborhood. Very good condition. \$12,500. 4102 Victoria Ave. Jean White, 534-4073.

Rent by day or week, 1 bedroom furnished beach house, all electric kitchen, at Bolivar. Has boat dock in front. Evelyn Huvar, HU 3-7626 (no home phone).

2 bedroom home in Bacliff. 1 1/2 from Bay, fenced in yard, large backyard. \$8500. Doris Hetkes 966-1321.

Unusual 4-2-2 in Deer Park. Electric kitchen, large paneled family room, formal living room, central air, carpets, drapes, redwood fence. Two extra bedrooms give total of 2500 sq. ft. of living area. Equity and assume loan. Total under \$19,000. Major C. W. Leaverton, GR 9-3759.

Sunvalley, brick 3-1/2-1, boat garage, carpets, central heat, window units. Small equity and low payments. Nice neighborhood. O. J. Guiberteau, 944-3498.

4-2-2 Old English in Newport, carpet, drapes, fence, patio, formal living, dining rooms, family room, four months old. Equity, assume FHA 6 1/2% payments \$175. Warren J. Huffman, League City 932-4559.

El Lago. Brick 4-2 1/2-2, family room, morning room, formal dining and living rooms, utility room, central air, complete carpeting and drapes. Fireplace, large oak trees, redwood fencing and landscaped. Harry Day, 877-1152.

Residential lot in restricted area, 1 1/2 acres on FM 1764 2 mi. west of IH45 near Alta Loma. 350' frontage, established community, high ground. Harry Day, 877-1152.

4 miles to MSC: 2250 sq. ft. corner brick, 3 large bedrooms and playroom, 2 baths, separate dining & dinette, family room, living room, 10x14 utility room, central air & heat, dishwasher, disposal, automatic double oven, intercom, carpets & drapes. Close to schools, shopping, pool & bay. \$160/mo. \$18,000 balance at 5 1/4%, 1801 El Mar Lane, Seabrook, W. Gray.

Lot in Lake Livingston Acres, 250'x600' (3.44 acres). Total price \$2975 cash or equity and assume \$1500 balance on 3/4% loan. John Richardson, 946-7587.

FOR SALE—AUTOS

63 MGB, good condition, new tires, \$750, Bill Gravett, MI 4-4468 or GR 1-3284.

65 Ford Fairlane 500 sports coupe two-tone, V-8 289 engine, Cruisomatic mission, pwr steer, air, radio, tinted glass, padded dash/visors, undercoated. \$1395. D. Swift, HU 2-7277.

66 427 Corvette convertible, both tops, Nassau Blue, 26,000 miles, Firestone "500" tires, \$2600 cash. Roy Linton, WI 5-4651 Texas City.

65 VW, one owner, Bahama blue, radio heater, WW tires, 27,000 miles, excellent condition throughout. \$1000. Welby Ward, 946-5182.

56 Mercury Montclair, good dependable work car, new battery and tires, 2-dr, std. w/overdrive. W. Bromby, HU 7-2361.

56 Thunderbird, recently repainted in good running condition, \$1300. R. E. Wilson, HU 8-4139.

61 VW sedan, black with red seats. Good engine, runs good, new battery, trailer

hitch, 78,000 miles. Best offer. Jerry Goodman, HU 8-0609.

65 Mustang, 4-speed transmission, V-8, low mileage, excellent condition, Bill Gravett, 471-3284.

66 Rambler 770 station wagon, air, automatic, excellent condition, low mileage, still in warranty, \$1850. T. Sampsel, GR 1-0172.

60 T-Bird, power steering, power brakes, air conditioned, new tires, new front seats, quick sale, \$500. W. J. Wagoner, SU 2-2627.

62 Chevrolet Bel Air 6-cyl. 4-dr., factory air, automatic transmission, 2 new tires. \$395. Major C. W. Leaverton, GR 9-3759.

64 VW Squareback, very good condition, \$1000. New valve job, new brake linings, new shocks, Bluebook prices must be determined from prices of a like 1966 model as this is the first year the squareback was imported. There are no Bluebook prices from 1965 down. D. K. Ford, 944-2037.

66 LeMans, 2-dr. hardtop, 326 V-8, power steering, power brakes, air, automatic transmission in floor, excellent condition. Travis Brown, HU 2-1582.

62 Ford Country Squire, air conditioner; power brakes, steering, windows; in excellent running condition. \$775. D. O. Coons, 877-2210.

62 Chevrolet wagon, 6 cylinder, stick, excellent throughout, \$495. Bill Tomkins, 534-2276 Dickinson.

Investment opportunity: Buy and drive this very rare classic British racing car and sell at a profit. Mint 1938 "TA" series MG roadster, factory-modified for hill racing. Distinctive strapped bonnet, RH steering, tach, spokes, cycle fenders, 2 clocks, new ragtop. Perfect 4-speed engine. Original chrome and Woodland Green finish. The last of this famous breed. \$2500 firm. 877-4102.

61 Corvair Model 700, 4-door sedan, manual 4 forward speed shift, white, \$300. O. Kuhlmann, HU 8-3278.

66 Pontiac Custom Tempest 4-dr. sedan auto. trans. power steering, factory air. Other deluxe features, shop manuals, clean excellent condition, \$1695. John Welch, MI 9-2601.

FOR SALE—MISCELLANEOUS

16 ft. fiberglass boat, big two-wheel tilt trailer, 100-hp Mercury motor, canopy. MI 5-0188.

Mobile home for lease, furnished, air. Will relocate to your choice area, if on a long-term lease. Reasonable rent. Floyd A. Turner, RE 3-7667.

1964 Corvette Positraction rear axle assembly, complete w/traction bars, suspension assy, wheel hubs, brakes etc. \$115. Also Corvette dashboard (all instruments except radio) \$45. Ron Hagood, WI 8-2870, Texas City.

1966 Honda Dream 300, good condition, will sacrifice for \$350. J. Reil, WE 5-6822 (LaMarque).

Step table \$12.50. Pair of fireside chairs; set 4 folding doors plus hardware (never used) \$15. Two ballbearing spice racks (new, still in boxes) \$2.50 ea. or \$4; several new cornice boards up to 12 feet (never used) 30c per foot; 5 fluorescent fixtures and tubes wired for cornice board indirect lighting as 2, 3, or 5 light strips from one wall plug; glass and 6 new unfinished picture frames of 2 inch material; mirror squares. Keener, HU 8-1193 after 5.

Two year old Harmony arch-top standard guitar with leatherette case. Guitar and case cost \$50 new. Will sacrifice both for \$20. Welby Ward, 946-5182.

Collie puppies, AKC-registered, whelped April 12, 1968, vaccinated and dewormed, Sire: Lode Ark's Country Boy; Dam: Mirror's Miss Tina. \$50. Hooper, 488-4120.

Antique gold wrought iron table with champagne glass top and four matching chairs with apple green leather cushions. Original price \$200. Used 2 mo. Sell \$150. Evelyn L. Huvar, HU 3-7626 (no home phone).

Fireplace screen with draw drapes, log holer, tools with one extra large log prong holder, all match and grate. \$50. Evelyn L. Huvar, HU 3-7626 (no home phone).

Stud Service—Champion English stock, male silver blue AKC registered miniature poodle. Evelyn L. Huvar HU 3-7626 (no home phone).

1 pair \$18 dark men's dress slacks, waist size 44, length to fit 6' man. Cleaned once. Sell \$10. Evelyn L. Huvar HU 3-7626 (no home phone).

Safety approved helmet for 6 to 13 year old, \$15, quarter-midget motor, Double A, brand new, \$60. Two Hickman racing uniforms, sizes 12 & 10, \$5 each, complete cub scout uniform, \$8. Phyllis Morton, 946-4752.

All porcelain compact kitchen Dwyer E 60-RE (Series 60) 63" wide 25" deep, 87" high, unit consists of B-burner electric range, 2 separate oven burners, deep bowl sink, faucets, 5.3-cu. ft. refrigerator & freezer, lights, appliance outlets, 12-cu. ft. of storage space in overhead porcelain cabinet, additional storage area under sink, used approx. 9 months. Cost \$628.29 new, want \$300 cash. Muhly, GR 1-3762.

Savage 940 single-shot 20-gauge shotgun with quail choke, shoots 3 in. magnum shells, excellent condition, plus box of 20-gauge shells, \$17.50. Also spinning rod, gun case, and ball return (for Little League baseball pitching practice). Percy Hurt, HU 2-7837 Friendswood.

Cosco high chair, \$7. Baby bed w/o mattress, \$5. Infant seat, \$7.5. Ted Lapko, 946-4311.

6-yr. old Zenith black and white TV. Good working condition, has new tubes. Want to replace with color. Take best offer. Jerry Goodman, HU 8-0609.

U.S. Finn Number 297. Racing class, Olympic single-handed boat. Rigged for racing. Two-time winner Texas Finn Association Championships. Two sails, one new (both North). Trailer included. Less than \$1000. Jerry Goodman, HU 8-0609.

Chrome tubular steel kitchen table with pearl-grey plastic top, good condition, \$15. V-M portable record player, \$10.

AKC Cocker puppies, 8 weeks old, particular, champion sired—very nice. Repeat of breeding that produced champion. Emily K. Roberts, 946-6176.

9x9 umbrella tent, \$30. VW floor pan for dune buggy, \$10. 9-ft. Frigidaire refrigerator, \$20. 50 lbs. of B-C type dry-chemical fire extinguisher powder, \$15. VM manual turntable, \$15. R. I. Lowndes, HU 8-3530, ext 2025, or 534-5682.

Registered Dachshund female, (spayed). Five years old, good house pet but not good with children. Free to good home. J. Cunningham, HU 8-1390.

Sunfish-type sailboat with licensed trailer. \$250. Dennis Johnson, 591-3541.

Hallicrafter HT-37 transmitter, SSB-DSB-AM-CW, 100 watts PEP, excellent condition, \$175 or best offer. A. S. Girala, WA 1-7212.

17' sailboat, explorer class, all fiberglass with dacron main and jib, covered foredeck with cuddy, spacious cockpit, stability, roominess, and storage space makes it a perfect family boat, excellent condition with a galvanized tilt trailer. \$1650. T. Sampsel, GR 1-0172.

Like-new Polaroid electric-eye Land camera, Model J66, will take color and black and white, \$75. Dorothy Szopski, 944-4941 after 5.

Upright Davenport piano, excellent condition, good tone, complete with bench. \$285. Major C. W. Leaverton, GR 9-3759.

12-ft. Frigidaire refrigerator, '62 model with freezer compartment, excellent condition, must sell, \$70. Jerry D. Allen, 946-3690 after 5.

Almost new dual pickup electric guitar and Fender Vibro Champ amplifier, both for only \$100. Ann Jorgensen, GR 2-5469 after 6.

Miranda-DR 35mm single-lens reflex camera with Auto Miranda 50 mm f/1.9 lens and leather case. \$55. Charles Krpec, MI 5-6089.

Phillips 4-track-stereophonic tape recorder, with mike, in excellent condition, \$50. Karen Cruz, GR 3-8658.

Westinghouse electric motor, 1/2-hp, 1725 rpm, suitable for drill press or power saw, etc, brand new, never used, perfect condition. \$20. Roy Lang, HU 8-0149 after 6.

Fine violin, excellent condition, \$200. David Sklar, 932-2613.

Hi-fi components; McIntosh, MA-230, integrated stereo amp., still under warranty, \$300. Citation III, FM tuner with EICO multiplex adapter, \$85. 932-3419.

Man's watch, Benrus 17-jewel, calendar, self-winding, waterproof, adjustable 3 yr. guarantee. Never worn. Won in a contest. List \$71.50, asking \$50. Russell Lewis, GR 9-1197.

15' fiberglass boat with 1966 model 40-hp Evinrude, electric start and shift—trailer not suitable for the road. \$550. L. Brown, 591-2668.

390 c.i. Ford engine & autotrans, complete except for intake manifold, \$150 for all. 23" Admiral color TV, picture tube bad, \$40. Bill Douglas, HU 7-0446.

1966 Sports 50 Honda, approx. 3600 miles, looks like new, \$100. J. R. Crain, 946-4458.

6x6 cm Zeiss Ikonflex, f/3.5 Zeiss Novar lens, ever-ready case, lenshood/filter holder, no flash synch. \$25. Terry White, 932-4472.

Scuba wet suit, medium size, \$18. Larry Schmitt, 534-5207.

Sealy Comfort King Premier twin-size mattress and box springs with headboard, excellent condition. \$40. H. Kaupp, MI 9-4357.

110-volt air conditioner; 2-wheel enclosed utility trailer; hamster cage. Heinold, HU 8-3786.

Hammond organ, 14 months old, like new—Model L-122, spinet, \$800, including sheet music. W. Stoney, Jr., 877-1081.

Dyna FM stereo tuner, Dyna stereo pre-amp, Dyna stereo 70-watt power amp. Replacement cost over \$400, my price \$250. In mint condition. Robert Hymer, MI 9-0416.

Photographic equipment: enlarger, developing tanks and trays, print dryer, timer, darkroom lights, miscellaneous supplies. \$60. Phelan, 966-2193.

Four Hemisfair ticket books at NASA cost of \$5.75 each, contain 1 gate admission. Jim Hill, 733-4920.

Cruise down the lake this summer in this authentic Chinese sampan from Hong Kong. Conestoga-style top, 6hp Mercury longshaft engine. Bottom, paint new. First \$240. E. Horton, 877-4102.

8' El Toro racing pram, sails and trailer complete, \$240 firm. HU 3-4276.

Compact vacuum cleaner, \$25. Mini bike, \$60. 20-in. stingray type bike, \$20, desk & chair, \$15, sleeping bags, \$3. Electric guitar, \$35, gasoline engine, \$5. 5 in. pneumatic tires & wheels, \$2, Go-cart wheels & sprockets, \$1. Sinker mold & lead, \$3. 1801 El Mar Lane, Seabrook, W. Gray.

Air conditioner, Gibson, window unit, 14,500 BTU, \$85. John Lottinville, HU 8-3128.

Cathode ray tube, Type 5ABP7, long persistence phosphor, \$15. Roy Lang, HU 8-0149 after 6.

One 13-ft. lateen-rigged sailboat (home built), reasonable. C. F. Deiterich, 482-1859.

WANTED

Wanted: TV, Hi-fi components, working or not; also self-propelled lawn mower, edger, sailboat. Don Frisbee, 946-7193 Houston.

Will share driving or ride. Freeway Manor to MSC, 8 to 4:30. Don Frisbee, 946-7193.

Need companion and supervision for 13 yr. old boy for summer in Clear Lake area. Keener, HU 8-1193 after 5.

Wanted—Old TV's or other electronic components. Boys wanting parts for experimental purposes. Will pick up. J. G. Pulliam, HU 8-2250.

1958 to 1962 Vespa "400" automobile, any condition. George Koepke, 488-2797.

Wanted: set of golf clubs. Will pay up to \$25. Frank Park, HU 7-1255.

Need ride for League City high school summer school June 24 thru July 12th from Clear Lake City Rec. Center location. K. Keener, HU 8-1193 after 5.

9.5-20hp Evinrude or Johnson outboard with tank. 12-14 ft. aluminum (Jon) boat. All must be in good condition. Jim Maxwell, HU 2-1015.

Wanted: late model Mercury outboard motor, 18 to 25hp. J. W. Smith, Kemah 877-1056.

Want to join carpool from South Park-Belfort to MSC Bldg. 2. Linda Robertson, RE 3-7721.

Wanted—2 or 3 tickets to the All-Star game in the Astrodome. L. Brown, 591-2668.

2-drawer or larger filing cabinet; also need used wooden or metal desk with drawers. Walt Bobo, 487-1534.

2-door refrigerator-freezer, any non-white color, will pay up to \$45. Will pay up to \$20 for TV with good picture. Will pay up to \$60 for washer-drier combo in non-white. Hooper, 877-1328.

Want to join carpool from Glen Cover to MSC 8-4:30. Hooper, 877-1328.

Free boat dockage: want to exchange pier privileges at my home on south shore of Clear Lake for the use of motor or sailboat at owner's convenience, will furnish own gas. Hooper, 877-1328.

Bloodmobile Has Three Visits Left

The MSC Blood Deposit Program has three more bloodmobile visits scheduled during June to MSC and aerospace contractor locations. Operation hours will be from 9 am to 1:30 pm.

Dates and locations are as follows: June 24 — MSC Bldg 8; June 25 — Lockheed Beta Bldg, and June 26—Lockheed Beta Bldg.

To add to a blood deposit account or to join the blood deposit program, call one of the following: Ed Stelly MSC, Ext 3378; Bill Averyt B&R-N, HU 8-2500; Jim Hallmark NR, HU 8-2720; Mo Trembly GE, 932-4511 Ext 2134; Shirley Kackley Lockheed, HU 8-0080 Ext 250; Lile Perrone Dynalectron, MSC Ext 7495; Sara Weyer Boeing, HU 8-1784, and Larry Salyers AT&T, HU 8-1010.

Spanish Club Elects Officers

The MSC Spanish Club June 25 will meet to elect officers for the club year beginning July 1. Officers to be elected are president, vice president, secretary, treasurer and program chairman. The meeting will be in Bldg. 13.

The Club plans to launch a new series of Spanish classes in the future. Meeting programs include speakers from different Latin American countries as well as local speakers. Slides and movies of South American countries will also be shown at future club meetings.

Todos son bienvenidos a nuestra junta.

Chess Group Active in Area

A ladder tournament and matches with other Houston-area clubs are among the events planned by the Clear Lake Chess Club.

The newly-organized club has been meeting each Thursday at 6:30 pm at the Singing Wheel on Highway 3 just north of NASA Road 1 in Webster. Beginners and experienced players are invited to drop in for a few games each week.

Further club information may be got from Bob Bond at 4704 or from Bill Chew at 488-3530 Ext 2518.

EMMA LAZARUS

"Give me your tired, your poor, Your huddled masses yearning to be free, The wretched refuse of your teeming shore, Send these, the homeless, tempest-tossed, to me: I lift my lamp beside the golden door." *The New Colossus: Inscription for the Statue of Liberty, New York Harbor*

Buy U.S. Savings Bonds, new Freedom Shares

Space Palette



WAY-OUT ART—"Exploring Space," a collection of 28 paintings of US and Soviet spacecraft by TRW illustrator John Desatoff, is on display in the side lobby of the MSC Auditorium. The collection is touring the US and Canada under the auspices of the Smithsonian Institution Traveling Exhibition Service and will remain at MSC until August. Viewing the paintings are assistant director of the Houston Museum of Natural Science Carl Aiken, left, and Burke Baker Planetarium director Armand Yramategui.

Jammed Aileron Named Williams Crash Cause

A jammed aileron control apparently caused the crash of a NASA T-38 jet trainer last October 5 which killed astronaut Clifton C. Williams, Jr. Williams was en route from Patrick AFB, Fla., to Brookley AFB, Ala.

Following an exhaustive analysis of all factors in the case, the accident investigation board concluded that the primary cause of the crash was a jam in the lateral control system (ailerons) from unknown source.

An accident board appointed by MSC Director Dr. Robert R. Gilruth said evidence indicates that the aileron control on the jet became jammed so that the airplane rolled to the left.

The plane crashed near Tallahassee, Fla., before Williams was able to complete the ejection procedure, although he did start the ejection and the seat was clear of the airplane. It was calculated that the ejection occurred only about 1,500 feet above ground.

Because of the condition of the wreckage, the Board said, it was unable to find out what jammed the controls. The most probable origin of the control problem is believed to be a foreign object in the aileron control system below the rear cockpit.

The investigation board, headed by astronaut Alan B. Shepard, included other pilots qualified in the T-38.

Williams, a major in the US Marine Corps, became an astronaut in October, 1963. He was traveling from Cape Kennedy, Fla. to Houston.

Williams was flying at 22,500 feet when the incident occurred. He radioed a position report over Orlando. Although the records showed all conditions and procedures were normal before takeoff and through the flight until he reached the vicinity of Tallahassee, the pilot was heard on radio giving the "May Day"

distress signal and saying, "... this is NASA 922, ejecting just off Orlando, I mean Tallahassee."

After studying the evidence, the Board ruled out engine failure, loose baggage in the rear cockpit, pilot incapacitation and fire as probable causes, and said the jammed controls resulted in a roll to the left from level flight, followed by a steep dive into the ground. When he began the emergency ejection procedure, the pilot was too near the ground and had reached a speed above 700 miles an hour.

The Board studied records of previous flights in the airplane, in a search for clues to possible malfunction, but found nothing abnormal.

The Board recommended that NASA improve its inspection procedures for the T-38 so as to include a mandatory inspection on delivery to NASA.

Actions taken by NASA since the accident followed Board recommendations and now include a thorough periodic inspection of the T-38 control systems to prevent control jamming, instruction of pilots on the limitations of the ejection system and on safe storage of equipment in the plane.

College Faculty Fellows Attend MSC Programs

More than 60 engineering and science professors, instructors and research staffers from colleges and universities from across the nation are attending three summer faculty fellowship programs at MSC. The programs are aimed toward stimulating idea exchanges between NASA and the teachers while refreshing the research outlook of their home institutions.

A total of 35 participants are enrolled in the NASA-ASEE Summer Faculty Fellowship Program, including 11 who are second-year recipients. Under this program, directed by Assistant to the MSC Director for Academic Relations Dr. James L. Youngblood, each faculty fellow is assigned to an MSC senior engineer or scientist who acts as his research advisor. The fellow spends eight weeks on a research and development assignment and two weeks in orientation, classwork and seminars.

The second program is the NASA Faculty Fellowship Program in Systems Engineering Design and is conducted in cooperation with the University of Houston and Rice University. In the program, also directed by Youngblood, the 21 participating fellows are assigned to design teams for selecting and designing a complex space system to meet a given set of mission objectives.

The third program is the MSC Summer Visiting Faculty Appointments Program in which there are six participants who are assistant, associate or full professors in the fields of public or business administration, economics and management.

Fellows in the program are assigned to either research or operational tasks in MSC organizations.

Harold W. Whittington of Management Analysis Branch directs the Visiting Faculty Appointments Program.

Seminars and lectures conducted for participants in the three fellowship programs may be attended by regular MSC employees. For additional information and seminar schedules call the Employee Development Branch at 7311.

CSD to Test 1st Apollo EVA PLSS Today

The portable life support system (PLSS) to be used in the first Apollo extravehicular activity today was scheduled to undergo manned testing in Crew Systems Division's eight-foot vacuum chamber. Astronaut Thomas K. Mattingly was to enter the chamber at noon for a four-hour test run of the PLSS to be used by Russell L. Schweikart for EVA during the second manned Apollo mission.

Two unmanned tests of the PLSS were run June 14 and 15 in the CSD eight-foot chamber.

Office Upholders



INSTALLED—New 1968 officers of the American Federation of Government Employees Lodge 2284 are sworn in by AFGE 10th District Vice President Omer Jordan. Left to right are Lodge President Alma Hurlbert, First Vice President Joe Pirtle, Chief Steward Herman Fisher, Secretary-treasurer Norbert Philippi and Sergeant-at-Arms Albert Jackson. Second Vice President Bob Thrower is not shown. A special election for recording secretary will be held at the July 8 meeting in Bldg 30 Auditorium at 5 pm, and the recording secretary and second vice president will be installed at the meeting. An MSC Personnel Division representative will speak on workmen's compensation.

Lockheed Gets Orbital Escape Study Contract

A study of an Emergency Earth Orbital Escape Device will be made by the Lockheed Missiles and Space Company, Space Systems Division, Sunnyvale, California, under a \$200,000 contract with MSC.

Under terms of the fixed-price contract, Lockheed is to develop a conceptual design of a three-man entry vehicle in earth orbit (up to 300 miles). The escape device could be launched with future space vehicles, to remain in orbit until needed.

During the first part of the eight-month study, several concepts are to be developed. Midway through the contract performance period, one or more concepts will be selected by NASA for a detailed conceptual design. An analysis will then be performed to determine an optimum integrated selection of subsystems, aerodynamic shape and stability, and division of operational responsibility between automatic systems and manual crew control.

Comparisons will be made between the three-man escape vehicle and concepts developed under other study contracts. In addition, variations to the basic design will be considered to determine the effects of increasing the crew capacity and also of reentering from higher altitudes including emergency reentry from a 19,400-mile-high synchronous earth orbit.

Lockheed was one of three companies responding to a NASA request for proposals on the study.